Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions	)	Docket No. 12-268

SUPPLEMENTAL COMMENTS OF CELLULAR SOUTH, INC.
REGARDING THE 600 MHZ BAND PLAN

Cellular South, Inc. (d/b/a C Spire Wireless) ("C Spire") submits these supplemental comments in response to the Public Notice ("PN")[1] issued by the Wireless Telecommunications Bureau seeking input on 600 MHz Band Plan proposals put forward since the issuance of the Notice of Proposed Rulemaking ("NPRM") in the above-referenced proceeding.[2]

INTRODUCTION

C Spire welcomes this opportunity to further evaluate and discuss the merits of the various band plans under consideration for the 600 MHz spectrum. Specifically, the PN raises several questions regarding whether the Commission should adopt one version or another of an FDD band plan or, alternatively, adopt a TDD band plan. For the reasons discussed below, including the benefits of increased flexibility, efficiency, and competition, C Spire urges the

[1] *Wireless Telecommunications Bureau Seeks to Supplement the Record on the 600 MHz Band Plan*, Public Notice, Docket No. 12-268 (rel. May 17, 2013) ("PN").

[2] *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, Notice of Proposed Rulemaking, 27 FCC Rcd 12357 (2012) ("NPRM").

Commission to adopt a TDD band plan for the 600 MHz spectrum. Given the sheer complexity of the broadcast incentive auction and the reality of today's downlink-heavy data traffic patterns, a TDD band plan offers the most flexible, efficient and forward-looking means for allocation of the 600 MHz spectrum for mobile broadband use.

Today's mobile networks and the projected networks of the future must accommodate more downlink than uplink data traffic. Given current patterns and the anticipated continuation of asymmetric data traffic trends, a continued policy or technological commitment to symmetric, FDD spectrum pairings no longer makes sense.

In addition to developing a band plan that has the flexibility necessary to accommodate today's and future asymmetric data traffic patterns, the Commission must adopt basic structural mechanisms to ensure competitive wireless network operators and new entrants have a meaningful opportunity to acquire usable spectrum, enhance competition, and provide consumers with viable alternatives to the Bell duopoly.

This need is particularly acute in the context of the 600 MHz spectrum. As the Commission has acknowledged, access to low band spectrum (i.e., spectrum below 1 GHz), which provides broader geographic coverage at lower costs than spectrum above 1 GHz, is critical to the ability of both competitors and potential new entrants to meaningfully impact competition by expanding mobile broadband services."[3]

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[3] *See, e.g., Annual Report and Analysis of Competitive Market Conditions With Respect to Mobile Wireless, Including Commercial Mobile Services*, Fifteenth Report, 26 FCC Rcd 9664, ¶ 307 (2011); *Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993*, Fourteenth Report, 25 FCC Rcd 11407, ¶ 283 (2010) ("Fourteenth Competition Report"); *Application of AT&T Inc. and Qualcomm Inc., Order,* 26 FCC Rcd 17589, ¶¶ 49-51 (2011) ("AT&T-Qualcomm Order").

DISCUSSION

I. THE COMMISSION SHOULD ADOPT A TDD BAND PLAN

To maximize spectrum availability and utilization and to promote spectrum efficiency and competition in the mobile broadband industry, the Commission should adopt a TDD band plan for the 600 MHz spectrum. While much of the U.S. wireless industry, including C Spire, has previously focused on the development of FDD spectrum pairings, operation of today's mobile broadband networks dictates a new course. After significant consideration of both FDD and TDD options for the 600 MHz band plan, C Spire has concluded that only a TDD band plan can overcome the challenges posed by the complexity of 600 MHz auction, lead to successful mobile broadband deployments on the 600 MHz spectrum, and combat the consumer harms resulting from the current, consolidated state of the nation's wireless industry.

A. TDD is the broadly-accepted technology for today's wireless deployments.

While FDD adoption, especially in the context of LTE deployments, is largely a function of backward-looking policy and deployment decisions rooted in the historic support of voice services, new spectrum allocations have and should "naturally gravitate to TDD-LTE."[4]

Globally, TDD is a widely-accepted and utilized technology.[5] As mobile communications usage has increasingly shifted away from circuit-switched voice services toward today's data-centric communications, TDD has become the preferred technology of many mobile

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[4] *See, e.g.,* Hossein Eslambolchi, PhD, *LTE TDD versus FDD debate*, 2020 Venture Partners Blog (Dec. 28, 2011) (http://goo.gl/NpZs2).

[5] *See, e.g.,* Sprint NPRM Comments, p. 19 (listing 9 existing operators who have already deployed TDD technology and citing commercial deployment plans of 26 additional operators with "clear TDD-LTE commercial deployment plans.")

broadband operators around the world – especially where new spectrum is being made available for deployment. For example, TDD-LTE is being broadly embraced as "a superior technology option for data-centric networks," as evidenced by the Global TDD-LTE Initiative (GTI), which currently support 30 members who serve in excess of 1 billion subscribers.[6] Similarly, Nokia Siemens Networks and Motorola have each pledged a long-term commitment to both TDD and FDD operation of LTE.[7][8] These deployments and commitments reflect the reality of today's mobile broadband networks and the need for those networks to have the flexibility that TDD provides to accept and adjust to asymmetric data traffic patterns.

For the 600 MHz spectrum, the Commission should adopt a TDD band plan to ensure that our nation's next-generation mobile broadband networks have the flexibility necessary to remain competitive in a world of increasingly asymmetric data traffic.

B. TDD permits the flexibility today's and future data traffic patterns demand.

There is general consensus among wireless data traffic projections that downlink traffic does today and will continue in the future to substantially exceed uplink traffic.[9] C Spire's own data traffic patterns are consistent with these trends. Today, C Spire's network handles, on average, at least 2.33x more downlink traffic than uplink traffic. In a recent 3GPP submission, AT&T summarizes concisely the market reality of today's data traffic flows: "[t]o meet the

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6 Clearwire NPRM Comments, pp. 4, 9.

7 Nokia Siemens Networks NPRM Comments, p. 11 (indicating its "long-term commitment to both the FDD and TDD modes of operation for LTE.")

8 *See*, Motorola, "TD-LTE: Exciting Alternative, Global Momentum," White Paper (2010), p. 2. ("In TD-LTE, operators have a very intriguing [technology], with global momentum that matches its FDD counterpart.") (copy attached at Exhibit A) ("Moto White Paper").

9 *See*, *e.g.,* Sprint NPRM Comments, p. 19, n.37 (citing various analysis of data traffic trends).

market requirements of operators, downlink bandwidth demands are increasing constantly."[10] A TDD band plan provides the best means to solve this challenge for the 600 MHz spectrum.

In order to be competitive, an operator must have both uplink and downlink spectrum. Any TDD band plan, including the plan proposed by the Commission in the PN[11] and the plan proposed by Sprint[12] would enable each 10 MHz block auctioned to serve both the uplink and downlink needs of the licensee.[13] TDD also permits operators to customize the use of a given communications channel to the actual traffic that is being transmitted. As Qualcomm has noted in promoting TDD technology, the ability to "provide more downlink capacity" permits operators to "assign more downlink resources to meet actual asymmetric data usage."[14] Likewise, in promoting TDD as an "exciting alternative" with "global momentum," Motorola has said:

> *Typically more data travels in the downlink direction of a cellular telecommunications system, suggesting that the capacity should be greater in the downlink direction. TD-LTE systems make this possible by changing the number of time slots allocated to each direction. Often this is dynamically configurable, so it can be altered to match the demand. And, TDD-LTE standards already exist*

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10 "Proposed WID: LTE Advanced 3 Band Carrier Aggregation," 3GPP Document R4-132031, Submitted by AT&T to TSG-RAN WG4 Meeting #67, Fukuoka, Japan, May 20-24, 2013. (Proposing three downlink bands with one uplink band).

11 *See*, PN, p. 5-6.

12 *See,* Sprint Nextel NPRM Comments, pp. 21-23.

13 *See*, Alcatel-Lucent NPRM Comments, p. 11.

14 *See*, Qualcomm, "LTE TDD, The Global Solution for Unpaired Spectrum", Presentation Deck (September 2011), p. 14 (copy attached at Exhibit B) ("Qcomm Deck").

that permit an operator to adjust the amount of capacity in a TDD channel is [sic] devoted to uplink versus downlink transmission.[15]

Given these benefits, it is not at all surprising that Qualcomm promotes TDD as "the optimal technology to leverage unpaired spectrum." The flexibility to provide asymmetric uplink and downlink is important today and will be increasingly important in the future. The FCC should preserve that flexibility in the 600 MHz spectrum by adopting a TDD band plan for the spectrum.

C. TDD's flexibility enables greater utilization of limited spectrum resources.

As C Spire noted in its Comments on the NRPM, "[t]he organizing principle for all determinations regarding the band plan for the 600 MHz band should be this: the Commission must encourage competition by maximizing the amount of licensed spectrum available to be put to timely use for mobile broadband services."

A TDD band plan eliminates one of the most significant risks to spectrum efficiency and competition: a predominantly downlink-only spectrum allocation in the 600 MHz spectrum. An "FDD approach to the 600 MHz band plan [could] result in an inordinate amount of downlink-only spectrum blocks being made available at auction."[16] The auctioning of high-quality 600 MHz spectrum in all or mostly downlink-only blocks would be a disaster for wireless competition in the U.S. because, as Metro PCS puts it, in order for an operator to compete effectively, "having both uplink and downlink spectrum is an obvious necessity."[17]

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15 Moto White Paper, p. 3.

16 *See*, Alcatel-Lucent NPRM Comments, p. 12.

17 *See*, Metro PCS NPRM Comments, p. 21.

"Rather than expanding competitive opportunities, supplemental downlink spectrum [in the 600 MHz] magnifies low-band spectrum concentration" depriving potential new entrants to low-band spectrum operations and smaller operators "of opportunities to acquire spectrum suitable for uplink and downlink traffic."[18] So, an auction that includes significant downlink-only spectrum, which is probable with a FDD band plan, would pose a substantial obstacle to wireless competition by limiting the pool of potential bidders for those downlink-only blocks to incumbents who already control spectrum that can be aggregated with the new downlink-only 600 MHz blocks.

A TDD plan, however, prevents such a harmful, "no-uplink" result. With a TDD band plan, both downlink and uplink capabilities are preserved in each auctioned block, regardless of the total amount of spectrum cleared in a given market.

A TDD plan also reduces the risk of "stranding" spectrum that might otherwise be put to use in a given market. As the Commission's and Sprint's proposed make clear, a TDD band plan would not require a duplex gap. All available spectrum in each market could be allocated without wasting valuable portions of the spectrum to divide the uplink and downlink blocks. Because TDD blocks include both uplink and downlink spectrum and can utilize all spectrum that is made available in 600 MHz, a TDD band plan is the most efficient way to organize this scarce resource.

In the face of a continued increase in mobile broadband traffic in downlink spectrum, uncertainty over the amount of spectrum that will be available in a 600 MHz auction, and

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18 *See*, Sprint Nextel NPRM Comments, p. 15.

competitors' concern that an FDD band plan would limit the overall amount of paired spectrum available at auction, C Spire believes a TDD band plan is the best option the FCC has for meeting the 600 MHz auction goals.

II. BEYOND ADOPTION OF A TDD BAND PLAN, THE COMMISION MUST ADOPT AUCTION STRUCTURES THAT PROMOTE COMPETITION

While a TDD band plan will help to facilitate competition and innovation for the reasons discussed above, the Commission must also adopt basic auction structures now to avoid the need to later impose heavy-handed regulation on an even more consolidated wireless industry.

A. Device interoperability is a fundamental to broad and speedy deployment of networks across the 600 MHz spectrum.

"[W]e would not have [a] wireless system in America but for the requirement the FCC made 35 years ago now on interoperability,"[19] and the Commission must ensure interoperability in the 600 MHz band.[20] The widespread availability of devices is critical to effective deployment in the 600 MHz band, and such device availability depends on interoperability across the band. Before the auction, the Commission must establish clear rules requiring that all devices operating in the 600 MHz band be capable of operating across the entire band. This would ensure that deployments in this spectrum do not suffer from the stifling, anti-competitive harms that resulted from Auction 73. Without such rules, the 600 MHz spectrum will face the same sort of reduced consumer choice, absence of roaming opportunities, and limited

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19 U.S. Senator Mark Warner, "State of Wireless Communications", The U.S. Senate Subcommittee on Communications, Technology, and the Internet, at 1:27:04 (June 4, 2013) (http://goo.gl/ODfcl).

20 *See, e.g.*, Leap Wireless NPRM Comments, p. 7; MetroPCS NPRM Comments, p. 28; U.S. Cellular NPRM Comments, p. 23-30; T-Mobile NPRM Comments, p. 21; Sprint Nextel NPRM Comments, p. 17; National Telecommunications Cooperative Association NPRM Comments, p. 2-3.

deployment of next-generation wireless services across the country that we are witnessing today in the Lower 700 MHz spectrum.[21]

Even with a pre-auction interoperability requirement in place, it will be critical for the Commission to ensure that no one operator or bidder accumulates all or nearly all (measured on a POPs basis) of the 600 MHz spectrum on a particular spectrum block or set of blocks.[22] The Commission should establish pre-auction rules limiting the total accumulation of POPs in each spectrum block—such that bidders must acquire spectrum across all or a substantially broad variety of blocks in order to ensure significant national POPs coverage.[23] As a result, no one carrier could create an essentially proprietary or "boutique" band specification after the close of the auction that would limit devices to operating only on that carrier's licensed frequencies.[24]

Unless the Commission takes steps to preserve interoperability in the 600 MHz spectrum, multiple incompatible band specifications could emerge (as they did in the Lower 700 MHz spectrum), reducing the incentive for OEMs to develop devices that are available to all licensees operating in the 600 MHz spectrum.

B. Spectrum warehousing must be prevented.

The Commission must prevent warehousing of the 600 MHz spectrum. Regardless of band plan, the Commission's proposed population-based approach to build-out requirements will fail to ensure that less densely populated communities – especially those that may fall within a license area that contains a large city – will have timely access to the most advanced mobile

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21 *See* T-Mobile NPRM Comments, p. 21.

22 Id at 22.

23 *See*, id.

24 *See*, id.

broadband services. The larger the size of the geographic license area, the risk of this outcome increases. To protect against this risk, the Commission should utilize geographic build-out requirements similar to those required of Lower 700 MHz A and B Block licensees (e.g., offering service to 35% of each geographic license area after 4 years and 70% of each geographic license area after 10 years). Such rigorous requirements significantly increase the chances that 600 MHz licensees will move quickly to deploy next generation wireless services to consumers in America's vast non-urban areas.

C. The Commission should immediately clear Channel 51.

The Commission must clear Channel 51 before or through the incentive auction process. Deployments on the Lower 700 MHz A Block have been delayed by FCC rules requiring mobile broadband deployments on the A Block to unnecessarily "keep-out" of a significant area around Channel 51 stations. To facilitate the broadest possible deployments in both 600 MHz and the Lower 700 MHz spectrum, The Commission should eliminate the unnecessary "keep-out" zones and clarify that Channel 51 will be the first channel cleared in any market and used as a guard band in a TDD band plan. Additionally, the Commission should also consider clarifying whether Channel 51 broadcasters who voluntarily vacate the channel would still be entitled to recover auction revenues for Channel 51.

CONCLUSION

Successfully clearing and auctioning the 600 MHz spectrum will be complex. And, any future mobile broadband deployment on the spectrum must be flexible enough to accommodate today's and tomorrow's downlink-heavy data traffic patterns. In order to reduce auction

complexity and provide operators with the best opportunity to cope with asymmetric data traffic, C Spire urges the Commission to look beyond voice-centric, FDD band plans for the 600 MHz spectrum and adopt a TDD band plan that will promote flexibility, efficiency and competition in both the auction and in future mobile broadband deployments on this spectrum. In addition, the Commission must adopt basic structural mechanisms, including interoperability, robust geographic build-out requirements, and uniform clearing of Channel 51, to ensure competitive wireless network operators and new entrants have a meaningful opportunity to acquire and quickly and broadly deploy on 600 MHz spectrum.

Respectfully submitted,

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